DOCUMENT RESUME

ED 239 758 PS 014 106

TITLE	A Threat to Excellence: The Preliminary Report of the Commission on Higher Education and the Economy of New England.
INSTITUTION	New England Board of Higher Education, Wellesley, Mass.
PUB DATE	Mar 82
NOTE	29p.
PUB TYPE	Reports - Evaluative/Feasibility (142)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Economic Factors; Economic Opportunities; *Educational Improvement; Finance Reform; *Higher Education; Perceptual Development; *Public Education; *School Business Relationship; *Secondary Education
IDENTIFIERS	New England Board of Higher Education

ABSTRACT

Prepared by a special commission, this report charges that now is the time for New England higher education to focus on the critical relationship between our knowledge-based institutions and the needs of the region's economy. Section 1 highlights the commission's principal concern for the future of regional higher education institutions. Section 2 presents a basis for concern for the gradual undermining of the competitive strength of knowledge-intensive regions. Three factors are specifically discussed: (1) a fundamental weakening of the public school system, (2) a regional differential in the capacity to finance higher education, and (3) a change in the perception of economic opportunity. All three factors are supported by data provided in tabular form. Recommendations for regaining the competitive strength of the region include striving to overcome the perceived weakening in the public secondary schools, to overcome a regional differential in the capacity to finance higher education, and to improve the perception of New England as a region of opportunity. A call to action for public hearings is presented as the next step. Members of the commission and acknowledgments are also listed. (BJD)

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A THREAT TO EXCELLENCE

The preliminary report of the Commission on Higher Education and the Economy of New England

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MARCH 1982

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NEW ENGLAND BOARD OF HIGHER EDUCATION

Grants from the W. K. Kellogg Foundation, the Digital Equipment Corporation, and Germanium Power Devices Corporation provided the funds for printing this report.

Preface

To the New England Board of Higher Education:

In the Spring of 1979 the New England Board of Higher Education (NEBHE) formed a special Commission to explore the relationship between higher education and the economy in the six-state region. The Commission has evolved into a group of 33 prominent citizens representing higher educational institutions, finance, business, organized labor, and government.

Today the Commission is almost three years old. In all of our deliberations we have taken seriously our initial challenge "to raise the consciousness of our leaders and citizenry. . . but also to serve as a kind of watershed that will inform and enrich the activities of the Board."

The accompanying report represents our first effort in attempting to meet this challenge. This report has grown out of over two years of structured review and analysis as well as unstructured and spirited dialogue. Overall, three major seminars have been held and numerous papers commissioned to focus the work of the Commission. Task forces have been created to address the issues of state taxation and its impact on higher education, educational training and industry's occupational demand and the role of higher education in the conduct of state and regional economic policy. The specific results of this ongoing work will be provided to you and the Board in subsequent reports.

However, there is a strongly-held view among Commission members that the time has come to report to the Board on a number of the broader and vital concerns with which New England higher education is now confronted in our region's dynamically changing and growing economy.

A Threat to Excellence has been prepared based on the fundamental belief that New England is the most knowledge-intensive region in the world. Yet, at the same time, Commission members repeatedly have expressed concern about the financial and attitudinal ability of the region's higher education industry to retain this preeminent position in the face of increased competition from other regions. This report elaborates the specific nature of these competitive forces.

All of the Commission members have carefully reviewed the attached report and support its central thrust and specific recommendations. If this report could carry with it a single charge it would simply be that now is the time for New England higher education to focus on the critical relationship between our knowledge-based institutions and the needs of the region's economy.

On behalf of all the Commission members, we submit this report to the Board and our colleagues throughout New England.

James M. Howell
Chairman
Commission on Higher Education
and the Economy of New England

Foreword

The New England Board of Higher Education is deeply gratified to accept the preliminary report of the Commission on Higher Education and the Economy of New England, titled: *A Threat to Excellence*. Its publication marks the culmination of the first half of the commission's agenda: analyzing the contribution of higher education to the region's rapidly growing knowledge-intensive economy.

The report grows out of a series of broad-based Commission initiatives over the past three years, including conferences, seminars, survey research, studies, and extensive consultation with leadership from business and industry, government, labor, journalism, and higher education. This body of work has been conducted with the deliberateness and flexibility the subject continues to require.

The Commission's recommendations are ambitious; their scope requires a sturdy vehicle for action. Nonetheless, we believe that by effectively challenging regional leadership from a cross-section of fields, the commission has already fostered the beginning of the coalition required to implement the major item on its agenda: bringing about, directly and indirectly, new partnerships among higher education, business, government, and labor to further strengthen New England's economy.

If the Commission and board can successfully encourage a working coalition that cuts across state lines and views higher education as an essential investment in an increasingly productive and humane New England economy, then we will have done our job, and the Commission's final recommendations will provide a regional as well as national benchmark.

Dr. James M. Howell, senior vice president and chief economist of the First National Bank of Boston, has provided energetic and dedicated leadership as chairman of the Commission. His perspective and abiding sense of humor have yielded lively as well as informed deliberations. Each of the Commission's 33 members has contributed significantly to the perspectives which permit the concensus presented here.

We wish to express full appreciation to Dr. Robert E. Miller, NEBHE chairman, as well as his immediate predecessor, Senator John C. Revens, Jr., for their continued encouragement and support of the Commission's endeavors.

We are confident that as the Commission continues to work, higher education, both as a growth industry and creative enterprise, will be increasingly understood for its vital contribution to the development of the economy of New England.

John C. Hoy
President
New England Board of Higher Education

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I. The Commission's Principal Concern: The Future of Our Region's Higher Education Institutions

The Commission believes that the central task before the New England Board of Higher Education is developing a more complete understanding among all New Englanders of the relationship between the quality of the region's educational system and the performance of the region's economy. Indeed, an underappreciated but important premise of this report is that much of the region's economic success has been due to the incredible diversity, high quality, and broad base of our higher educational institutions.

In many ways, a "critical mass" of institutions of higher learning sets this region apart from others, particularly in terms of its capacity to innovate. Historically, the heterogeneous mix of universities and colleges has enabled the region to adapt to shifting dynamics in the national and even international economy. In recent years, these institutions, collectively, have given the region a competitive edge in technology-based industries, and also have helped to stimulate as well as attract entrepreneurial talent and to encourage new business start-ups.

With 260 colleges and universities, New England is unquestionably the most knowledge-intensive region in the world. The region has 50 percent more institutions of higher education per capita — and nearly twice as many private institutions per capita — than the nation as a whole. Approximately 800,000 students are enrolled in New England colleges and universities. This knowledge-intensity may be a key — if not *the* key — to the future prosperity of New England, for the quality of higher education has far more than a tangential effect on New England's economy.

Institutions of higher education play a strong direct as well as indirect role in the region's economy. With respect to the former, these institutions train people to meet the skilled labor needs of industries within the region for engineers, MBAs, scientists, and other professionals. Furthermore, through their expenditures, educational institutions contribute substantially to the region's economic base and are collectively one of the region's largest employers. New England colleges and universities have direct expenditures of 4.5 billion dollars, generating an estimated 11.25 billion dollars in their overall spending impact on the region's economy. As for their indirect economic impact, common sense suggests — and experience over the years demonstrates — that a good higher educational system attracts people to the region.

During the 80s, both student/graduate preferences and marketplace demands will necessitate institutional adjustments by universities and colleges in response to changing economic requirements. Student/graduate preferences, as measured in a national follow-up study of recent graduates, favor the more

career-specific majors — including business, natural sciences, engineering and education. These are viewed as most useful to college graduates.*

With respect to marketplace demands, New England will continue to have a special interest in maintaining a labor force with technology-oriented and sophisticated services skills. Specifically, employment in the high-tech industry accounted for 21 percent of the increase in aggregate New England employment between 1975 and 1980, while job growth in all services (including sophisticated services such as banking, insurance, health, education) amounted to 331,600 new jobs, or roughly 40 percent of the total regional employment increase. Together, the growth in these two sectors alone accounted for two out of three of the region's jobs.

Although the economic impact of professional education has been and will remain particularly important to New England, we cannot overlook the value of traditional liberal arts education to the development and enrichment of the individual and the region. To the extent to which there is a shift in enrollment demand by students for liberal arts degrees in favor of more specific career-oriented professional degrees, as has been the case in recent years, we must find ways to assure a healthy balance of liberal arts programs in professional degree curricula. By the same token we must take steps to include a greater content of technology subjects in traditional liberal arts degrees. As it is, engineers have inadequate cultural literacy and humanists have inadequate technology literacy. Neither situation meets the needs of an increasingly complex society.

As the Commission looks ahead through the 1980's and beyond, the ability of our colleges and universities to remain a positive force in the region's economy through their capacity to educate is no longer assured. At the same time, we are faced with the need to sustain our competitive edge in higher education which has given this region its innovative strength vis-a-vis other regions. Yet, as this report will show, higher education in New England as a basis for regional prosperity is being challenged by higher education in other regions, specifically among the energy-rich Southwest and Western states. This, indeed, is one of the major challenges of the 80's for the region and one which is reflected in the following views expressed by Commission members.

> "Is New England higher education focusing on the critical subjects that are going to shape the future of development? This is the question we ought to be asking ourselves. Are we thinking about and responding to the 'right' areas for education and training?"

*Ochsner, N. L., and Solomon, L. C., *College Education and Employment*. Bethlehem, Pennsylvania. The College Placement Council, 1979.

"What are the processes by which new thinking gets into the system? Many of our faculty are on the fringes of what were yesterday's scientific advances. How do you take an institution, which through the tenure system gets committed to plumbing, and orient it to tomorrow's engineering?"

"If officials in higher education attempt to adjust curricula based on an outside view of what we (industry) are doing, their changes are going to be outdated very quickly. Once they catch us in a time frame, we will already be doing something else. We must tell universities and community colleges what our manpower requirements will be."

"As we talk about the need to retrain the increasing proportion of older students in our institutions, we are finding that, in many cases, public policy restricts our ability to address this issue. Many programs which are currently available are almost impossible to use for anyone but traditional full-time undergraduate students. All of our continuing education adult services must, by definition, be 'self supporting,' which places enormous restrictions on the ability of the institutions to address those in more than a haphazard way."

"The varieties of opportunities for training manpower are multitudinous...I am not sure that any one sector (industrial or educational) really knows where all the answers are."

Implicit in all of these comments — and one of the clear areas of Commission consensus — is the need for an ongoing and focused dialogue among business, education, and government to maintain this educational dominance. Public policies, higher education institutional policies, and business policies all have mutually-supportive roles to play in helping colleges and universities respond flexibly to changing industry manpower needs. Moreover, if our competitive educational edge over other regions is no longer assured (or no longer as secure as it has been in the past) — a theme that will be developed in this report — then we will have to move from dialogue among these key participants in the region's economy to collaborative action.

One Commission member urged us to "put out a statement that starts out with the premise that we are a region that lives 'by its wits'." We are, indeed, such a region. Yet a region which has thrived in living "by its wits" must continue to do so, by meeting the challenge of maintaining a flexible, responsive system of higher education. As we look into the decade of the 1980s, this will not be as easy as it has been in the past.

II. The Competitive Strength of Our Knowledge-Intensive Region is Being Gradually Undermined: The Basis for Concern

Over the past two years much of the work of the Commission has been devoted to developing a more complete understanding of the current state of New England's higher education system. As these deliberations evolved, it became increasingly clear that the region's traditionally strong and competitively superior industry — higher education — was facing a number of serious problems. In this section of the report, three of the most significant factors are discussed in detail in order to establish the basis for the Commission's concern.

A Fundamental Weakening of the Public School System

The first factor affecting the competitive strength of the region's higher educational system is a fundamental weakening of the very foundation for higher education — namely, the public school system. Specifically, the public secondary school system has deteriorated measurably over the past decade. Yet, it is virtually impossible to maintain superiority at the college and university level without competent education at the primary and secondary levels. Moreover, students going on to post-secondary vocational education programs must frequently "relearn the basics," diverting resources that could be more productively used for technical training. Finally, for students seeking jobs directly after high school, the public school system must constitute the future backbone of the region's skilled and technical workforce. In all three cases, it is very clear to Commission members that the existing public school system is not fulfilling its goals.

A recent report by the National Assessment of Educational Progress (NAEP), a federally-sponsored project for monitoring the nation's elementary and secondary schools, provides evidence of a sharp decline in reasoning abilities among high school students — and the decline is particularly noticeable in the Northeast. The results of the assessment, which examined and compared reading, science and math achievement for 9-, 13-, and 17-year-olds in 1970-71, 1974-75, and 1979-80 did show that there has been progress in the basic reading skills in the early grades of elementary school. But, the reading, science, and math levels in the high school years — where reasoning and understanding are so important — have declined significantly. The relevant statistical data for in-school 17-year-olds is contained in the table below.*

National Mean Percentages and Changes in Correct Responses for In-School 17-Year-Olds in Two Reading Assessments

	Years		% Changes
	1971	1980	1971-1980
Total reading exercises	68.9%	68.2%	−0.7%
Literal comprehension	72.2	72.0	−0.2
Inferential comprehension	64.2	62.1	−2.1

While the overall trends in all three categories are a matter of national concern, the most relevant to our discussion here is the deterioration in inferential comprehension. It should also be noted that the rate of decline through

*These and the other data discussed in this section were taken from *Three National Assessments of Reading: Changes in Performance, 1980-81*. National Assessment of Educational Progress, Education Commission of the States, Report NO. 11-R-01, April 1981. Regrettably, the Commission was unable to disaggregate this data by subregions, e.g., for the six New England states. NAEP collects and analyzes the data solely on the basis of the four regions specified above.

the decade actually accelerated. There was a 0.9 percent decline during the first half of the decade, but it accelerated to a 1.2 percent decline in the second half.

The Commission's concerns are also reinforced by the statistical evidence that the most significant deterioration in inferential comprehension has taken place in the Northeast and in the big cities. Note specifically these changes in the data contained in the table below.

Results by Region and Type of Community: Mean Percentages and Changes in Correct Responses for In-School 17-Year-Olds on Inferential Comprehension Exercises in Two Reading Assessments

	Years		% Changes
	1971	1980	1971-1980
Nation	64.2%	62.1%	−2.1%
Region			
Northeast	66.3	62.6	−3.7
Southeast	59.4	59.4	0.0
Central	66.4	63.8	−2.5
West	63.3	62.0	−1.3
Type of Community			
Big Cities	62.5	58.6	−4.0
Fringes around big cities	67.8	65.0	−2.7
Medium cities	64.0	61.7	−2.3
Small cities	63.3	62.2	−1.1

One might not necessarily be alarmed by a national decline of 2.1 percent in inferential comprehension skills over a decade, because there are no guidelines to establish the importance of this decline. However, the differential decline among 17-year-olds in the Northeast vis-a-vis their peers in other parts of the country has disturbing implications for the region.

Finally, some might attribute this differential decline among Northeastern youths to a high percentage of disadvantaged minorities in central city school systems. Yet, this appears not to be the case. Indeed, it is important to note that virtually all of the decline in correct responses in two reading assessments has been among white teenagers. Again, the relevant statistics are shown for in-school 17-year-olds.

Results by Race and Region: Mean Percentages and Changes in Correct Responses for In-School 17-Year-Olds in Two Reading Assessments

	Years		% Changes
Among Whites	1971	1980	1971-1980
Northeast	72.7%	70.8%	−1.9%
Southeast	68.3	70.2	+2.0
Central	72.6	71.6	−1.0
West	69.9	71.6	+1.7
Among Blacks			
Northeast	56.1	56.1	0.0
Southeast	47.7	49.8	+2.1
Central	53.8	54.2	+0.4
West	51.8	50.8	−1.0

The preceding table reveals that in 1971 white teenagers in the Northeast performed better in their reading scores than their counterparts in other regions. By 1980, reading performance among white teenagers in the Northeast had slipped from first to third among the four regions.

Thus, the Commission concludes that there has been a significant decline among the region's high school students in the critical thinking skills that are needed to complete problem-solving tasks in the work place. This decline in critical thinking abilities is especially troublesome as universities and industries seek quality applicants in order to better match industry needs and higher education curricula. If the secondary school systems are not producing as great a body of students who can think critically, then higher educational institutions will be required to use their own increasingly scarce resources to teach skills that should have been acquired in the earlier years. Alternatively, New England's colleges and universities could simply turn away from educating the product of the region. Choosing between such alternatives may well become an unfortunate but necessary reality if our public secondary school system fails to retain its capacity to educate students. As one Commission member pointed out:

> "If New England is going to put its bet on the issue of higher education; that is, its knowledge-intensive base, then it should pay particular attention to the high school situation because it is going to have to build upon it."

A Regional Differential in the Capacity to Finance Higher Education

A second factor affecting the quality of our higher education institutions is a fundamental acceleration in the financial resources available to support and expand academic institutions in the energy-rich states of the Southwest and West, such as California, New Mexico, Oklahoma, Texas, and Louisiana. This development is a direct result of the dramatic rise in world petroleum prices in 1973 and again in 1979. Today, in these energy-rich states, substantially new financial resources have become available directly through the capital appreciation of university-owned, or controlled, oil and gas properties, and indirectly through the recycling of substantial surpluses in the state's severance taxes into publicly-financed higher education.

The swing in this "capacity to finance" higher education in these states is shown in the two region's expenditure rates in the following table. A brief comment about these per capita current funds expenditures is required.* Specifically, the expenditure figures have been adjusted to remove the effects of differential living costs across the states and regions. In this adjustment the U.S. Department of Labor's high family-income budget was utilized.

*These data were collected from *Financial Statistics of Institutions of Higher Education*, U.S. Department of Education, National Center for Education Statistics. Capital expenditures are not included in the data.

Real Per Capita Current Funds Expenditures By Institutions of Higher Education**

	U.S.	New England	Oil & Gas States
All Institutions			
1968	$ 83	$108	$ 86
1974	146	160	152
1979	232	243	234
Public			
1968	$ 50	$ 26	$ 62
1974	97	51	115
1979	154	81	177
Private			
1968	$ 32	$ 83	$ 24
1974	49	109	37
1979	78	163	56

A number of interpretative comments may be made to draw out the important conclusions that these data support.

- First, New England remains marginally ahead of the oil and gas states in per capita expenditures for higher education. Nonetheless, there has been a sharp increase in the real current expenditures per capita for both public and private institutions in the oil- and gas-producing states over the period of 1968-1979. This rate of increase, at 172 percent, is nearly 40 percent faster than the increase that took place in New England.
- Second, the differential expenditure rates between the oil- and gas-producing states vis-a-vis New England is due to higher expenditure rates in publicly-supported higher education. Throughout the period of 1968-1979, expenditure rates for publicly-supported institutions in the oil and gas states have been considerably more than two times the expenditure rates in the New England region. Clearly, this is where the competitive commitment and capacity to finance institutions of higher education in the energy-rich states will be most real to New England.
- Third, and as expected, New England expenditures per capita in private higher educational institutions continue to dominate over the country as a whole as well as the oil- and gas-producing states. Unquestionably, this statistical fact underscores the region's preeminent position in private higher education. Spending for private sector colleges and universities in the oil and gas states remains one-third that of their New England counterpart institutions. However, from 1968-1979, expenditures by private higher educational institutions rose 40 percent faster in the Sunbelt than in New England.

**These expenditures are supported by income from *all* sources — public as well as private funds. The analysis of the data on a per capita basis reflects total state population, including the student population.

The relatively high expenditures for publicly-controlled institutions in the Southwest and West is, in itself, a positive development for the nation. What is so disquieting is the potential for stagnation or even deterioration in the financing capacity for publicly-supported institutions of higher education in New England. These institutions will not benefit from the revenue stream of severance taxes that is available to their counterparts in the oil and gas producing states.

Although the preceding table does not provide a breakdown of the expenditure data on the basis of state financial support, a recent study by the National Institute of Education shows the relatively low level of state support for higher education among New England states. For 1980-1981, the national average for state allocation of tax revenue to public higher education was 11.3 percent. The percentage allocation for the six New England states is listed below:

Allocation of Collected Tax Revenues to Public Higher Education For Operating Expenses

	80-81 Percent	Rank Among the 50 States and the District of Columbia
Connecticut	8.4	42
Maine	7.5	45
Massachusetts	4.9	51
New Hampshire	5.6	50
Rhode Island	9.3	39
Vermont	7.5	44
U.S. Average	11.3	

The Commission notes with concern that Massachusetts ranks 51st in state support for public higher education. Indeed, all of the six New England states ranked well below the national average.

Clearly one policy option for increasing the operating expenditures of public colleges and universities in New England is to raise the share of state support. This step can be viewed as a long-term investment, crucial to each state's future economic vitality. However desirable this would be, the tight fiscal position of the New England states may well prevent this from occurring.

The data does not, however, suggest that we need to expand educational capacity in terms of new infrastructure and facilities in publicly-financed institutions. Surplus capacity with respect to physical plant for educational institutions exists throughout New England*. Nonetheless, there is a problem in financing noncapital costs, such as faculty and curricula development in response to changing economic needs in the region.

*The major exception is the need for an upgrading and expansion of research and teaching laboratories.

This problem will be exacerbated in the years ahead due to demographic trends; that is, the maturing of the population. The slowing of population growth — especially in older regions like New England — will result in a smaller taxpayer base to support publicly-financed higher education.

Thus, we may conclude at this point by stating that in the decade of the 1970s the oil- and gas-producing states retained a significant lead in spending by publicly-controlled colleges and institutions, while the New England states maintained a dominant position with respect to spending by private higher educational institutions. To be sure, our higher education system as a whole still excels in depth, diversity and excellence, but the gap in spending for all higher education institutions that favored our region in 1968 has almost disappeared.

A Change in the Perception of Economic Opportunity

A third factor that unquestionably impacts on the region's higher educational environment is the perception in this country that New England is no longer the region of greatest opportunity.* The potential consequences of this widely-held view are far-reaching, for once it is believed that a region has lost its economic vitality, it will fail to retain potential leaders, even if it can adequately train them.

In fact, this is proving to be the case for New England, despite the fact that New England is more successful in attracting new college students than any other region in the country. Indeed, New England's in-migrating students comprise 24.6 percent of new enrollments; Vermont, New Hampshire and Rhode Island rank third, fourth, and fifth respectively in the country in net in-migration at post-secondary institutions.

Moreover, in the decade of the 1970s, New England institutions of higher education have performed in a generally positive and responsive manner in providing training for those skills in greatest demand by the technology-based growth industries in New England. The New England performance is especially noteworthy in the area of engineering students. The region substantially outperformed both the nation as a whole and the oil- and gas-producing states in the generation of engineering and business degrees. The relevant data are shown in the following table.**

Earned Bachelor Degrees by Region Per 10,000 Persons
Area of Academic Specialization

	Business & Management			Engineering		
	1971-72	1976-77	1979-80	1971-72	1976-77	1979-80
New England	6.26	8.31	10.50	3.27	3.30	4.08
Oil- and Gas-Producing States	5.55	6.59	7.32	2.24	1.86	2.82
U.S. Total	5.92	7.01	8.24	2.47	2.24	3.04

*For documentation of the broad support for the view that Southern states provide a more positive climate for investment and employment, see the detailed survey results in *The Dynamics of Interaction Between Government, Business and Labor in the Northeastern United States;* Yankelovich, Skelly and White Inc., June 1981. Respondents in the Southern states provided a control group for this assessment of regional perceptions of opportunities.

**The source of these data is "Earned Bachelor Degrees Conferred by Institutions of Higher Education", U.S. Department of Education, National Center for Education Statistics.

Equally encouraging findings are contained in the forthcoming book, *New England's Vital Resource: The Labor Force.** For example, although New England educates 6 percent of the nation's students, the region trains approximately 8 percent of the country's undergraduate engineers. Moreover, in 1979 and 1980 the number of women earning A.B. degrees in engineering in New England has grown by a third. During these years, the increase was one-fifth nationally, so the region outpaced the U.S. in growth.

Notwithstanding these favorable statistics, the region's higher education institutions still are not keeping pace with the demand for technical professionals in the region. High-technology firms in New England as well as throughout the country are reporting shortages of engineers, computer scientists and managers with technical backgrounds, and it is argued that these shortages will persist for the foreseeable future.** The problem is caused largely by an inadequate educational capacity in these areas. For example, the "capacity crunch" that exists in engineering is due to an unprecedented gap in salaries for engineering faculty in comparison to industry positions. Unless greater financial resources are forthcoming to close the salary gap and to fund badly-needed equipment for research and teaching labs, the shortage of technical manpower will "squeeze down" the growth of the high technology industry which is so vital to the New England economy. Indeed, the implication for the region's economy is significant, inasmuch as companies tend to locate and expand where technological resources — skilled labor in particular — can be found.

Why should this be a concern to the region's educators? Just as the output of educated individuals affects a region's prosperity, so the prosperity of a region ultimately will affect the ability of these institutions to produce educated individuals. Furthermore, a region that loses ground economically is less likely to provide the resources to maintain its cultural amenities — often a critical factor in attracting students from outside the region. It is this mutually-supportive relationship between higher education and the region's economy that makes the loss of leadership a concern to those who are seeking to maintain the quality of New England's colleges and universities.

Contrast today's situation with that of two to three decades ago, when the Eastern Seaboard was viewed as *the* area of real opportunity. While the region has made an almost unparalleled recovery through high-technology growth and old mill-town revitalization, this region simply does not draw young trained people from other regions seeking advancement as it once did and is not "holding onto its own."

That New England has historically excelled in higher education has meant that educational attainment and economic opportunity co-existed in the region.

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*To be published by The American Council on Education and the New England Board of Higher Education in March, 1982.

**Yet, in a recent NEBHE survey of 400 New Englanders who are leaders in government, higher education, business, and labor 67 percent of the respondents considered high technology to present "the greatest opportunities for economic growth and stability in New England in the 1980's."

Now this is beginning to change, and a recent study on place of birth and place of business success provides some dramatic insight into this issue.

Specifically, the study shows that in 1951 approximately 44 percent of all Southern-born business leaders pursued their careers in the North, whereas in 1977 only 20 percent did so.* The study also revealed that in 1951 about 21 percent of the business leaders who pursued their careers in the South were born in the North. Today this has increased to 25 percent. Thus, the North is "losing the battle for business leadership," with a considerable percentage of Northern-born leaders migrating to the South and, at the same time, the Southern-born business leadership showing a dramatic geographical career preference for the South. The relevant statistical comparisons are shown in the following table.

Region of Birth and Region of Career

	1951 Study	1977 Study
Birth in South, Career in South	55.9%	79.4%
Birth in South, Career in North	44.1	20.6
Birth in North, Career in South	19.8	23.6

There are many complex factors that may account for these regional shifts in the perception of economic opportunity, but a factor that must be recognized as significant is the disparity in living costs in the North and South. A recent study carried out by The First National Bank of Chicago** reveals clearly that regional differences in living costs and taxes can and do dramatically influence the real disposable income situation of individuals.

Shown in the table below are the average differential (the U.S. average is the norm) regional living costs, state and local tax burdens per capita, and median family income for the six New England states and thirteen Sunbelt states. (The basic data input is disposable per capita income by state for 1975.)

Living, Tax, and Income Differentials In New England Relative to the Sunbelt

	New England Differential
Average differential living costs per capita	+ 117.5%
Average state and local taxes per capita***	+ 33.6%
Median family income	+ 13.4%

*James M. Howell, "Shifting Patterns in Southern Business Leadership" *Review of Regional Economics and Business*, October, 1979, pp. 3-9. These statistics represent a significant percentage of regional business leadership — those whose names appeared in the *Who's Who in Commerce and Industry*, a standard biographical reference work that includes roughly 18,000 names nationally.

**"Is Alabama Richer Than New York?" *First Chicago World Report*, The First National Bank of Chicago, May, 1977.

***Services that traditionally have been financed by state and local taxes in New England are more likely to be financed privately in the Sunbelt, thus accounting for part of the cost of living differential. Moreover, qualitative variations in service that cannot be quantified are not reflected in these cost of living figures.

Unquestionably, disparities of this magnitude will not go unnoticed as individuals plan their careers.

While the cost of living disparity contributes to an out-migration of professionals from the region, demographic trends alone within the region foretell the likelihood of potential labor shortages.

- The region's share of the 15-24 year age group is declining slightly more than that of the nation as a whole, but much more rapidly than the Sunbelt states. Consequently, New England will have a smaller proportion of youngsters graduating from its school systems — and entering the labor force — than the Sunbelt states.
- The average age of industrial workers in the region's manufacturing sector is in excess of 55 years. This important regional labor source will be joining the ranks of the retired during the decade of the eighties. Thus, labor shortages at the technical and skilled levels will become even more commonplace.

One has to acknowledge, however, that there is a positive side to the perception of the region's economy. A major regional strength can be found in the presence of R&D talent and facilities — particularly within the Greater Boston area — and the area's attractiveness to technology-based firms, potential entrepreneurs and those seeking a research-oriented career. New England's strong R&D base is not a new or recent phenomenon:

> Industrial research in machinery and instruments has been conducted in this region since the middle of the nineteenth century, and many of today's research-based firms owe much of their advantage to the accumulated firms which came before them. The robotics industry, for example, came out of a long line of New England machine tool development. In recent years robotics has been advanced by input from computer research, in particular from computer-aided manufacturing (CAM) developments which were themselves designed as an input for manufacturing firms. It is this total environment of industries and universities together making new products and processes in fields of common interest which provides a basis for high technology development.*

Continued growth in R&D spending may well be one of the more hopeful signs for the future economic vitality of the region.

Another potential, but generally unexploited strength, may be found in the expanding opportunities for employees to pursue advanced degrees while remaining on-the-job. Such opportunities not only help provide a more productive regional economy by keeping professional workers and management up-to-date on technological advances, but also can serve as a major industry recruitment tool for attracting skilled and semi-skilled workers. Higher educational institutions can respond to these opportunities by providing flexible programs to upgrade their labor force skills.

We may summarize by stating that these three pressure points will weigh heavily on the competitive educational edge our region has vis-a-vis other

*John S. Hekman and John S. Strong, "The Evolution of New England Industry," *New England Economic Review*, Federal Reserve Bank of Boston, March/April 1981.

parts of the country: (1) the decline in our public secondary school system; (2) the increased capacity to finance higher education in the energy-producing sates; and (3) a changing perception that the North is no longer the region of opportunity. Collectively, these factors add up to a negative trend in the region's "capacity to educate." Moreover, even if the magnitude of this trend does not appear to be significant, the direction does not augur well for the region's economy.

Reversing this trend constitutes a clear and direct challenge for educational, business and government leaders if we are to maintain a positive relationship between the region's institutions of higher learning and the needs of the New England economy. Our region can — and must — meet this challenge head on.

Recommendations: Regaining the Competitive Strength of Our Knowledge-Intensive Region

1: Recommendations to Overcome the Perceived Weakening in the Public Secondary Schools

The foregoing analysis of New England's competitive economic condition provides strong evidence that the young people in our high schools are not learning as they should, either in absolute or comparative terms. Without attempting to place the blame for this condition (educators, family, social environment, changing values, etc.) we see the secondary schools as critically essential to the strategies of insuring a favorable economic future for the New England states. While much of this analysis and the corresponding recommendations apply, appropriately, to our colleges and universities higher education relies primarily upon the flow of able young people from the secondary schools.

Of equal importance to our future New England economy (though only tangentially treated in this document) is the flow of able and employable young people, not college bound, into the work places. It should be noted that, in general, one-half of our high school graduates will pursue college, the other half will move immediately to work.

High school educators, including administrators and teachers, are urged to look upon the recommendations that follow, not as "another attack," but rather as a collegial expression of shared concern and long overdue readiness to help. Given the long view, the high schools and their communities are at least as dependent upon a viable economic future in the region as are the colleges — if not more so. And, their contributions to that future are crucial.

- **Expanded outreach to secondary schools in New England's urban centers should be undertaken by individual universities and colleges.**

  Higher education has neglected its significant responsibilities for the quality of secondary education within the region, especially in the older

cities. Coordinated, long-term effort is now required to redress the deterioration of achievement and standards, such effort to be mutually conceived and carried out by high school and higher education officials.

- **An assessment of teacher certification procedures should be carried out in each of the six states, including a review of legislative constraints.**

  Certification standards for teachers in secondary schools should be reviewed on a regular basis. Flexible standards should be permitted in cases where individuals have demonstrated their proficiency apart from the formal classroom. This condition has particular relevance to the fields of mathematics and technology, where grave shortages of qualified teachers are an increasing problem.

- **Senior personnel officers of major New England corporations should assist high school staffs in a periodic review of high school curricula, notably in fields relating to business and industry.**

  The purpose of this review would be to maintain a level of technical information/training in high school classes compatible with the evolving realities of the workplace. This review would be undertaken as part of the normal curricula reforms carried out by state or local education agencies.

- **Follow-up evaluation and assessment procedures for teachers should be developed and implemented on a state-by-state basis.**

  While the Commission acknowledges the difficulties inherent in the competency testing of teachers, performance evaluation in some form should be provided on a systematic and continuing basis. State commissioners of education should develop teacher evaluation and assessment techniques. Where weaknesses are identified, constructive assistance should be afforded, through the willing engagement of business and higher education resources.

- **The secondary schools should appeal to business and industry for key personnel to augment the teaching of mathematics and science. Industry should promptly respond.**

  The National Assessment of Educational Progress (NAEP) findings cited in our report clearly show a decline in reasoning skills among high school students, especially in the areas of mathematics and science. To help overcome this shortage, business should find non-traditional ways of involving itself in the educational process, for example, loaning technical experts to reinforce the teaching of high school computer courses. The disparity between the salaries of teachers of science and mathematics and individuals with corresponding skills in business and industry could also be ameliorated through this process. Part-time positions for such teachers in industry should be considered, affording them improved income, without requiring them to permanently leave the classroom.

- **Vocational education should be strengthened through the development of model programs involving "hands on" experience in actual work settings.**

  These programs should be based on an assessment of occupational

skills in demand after a review of Divisions of Employment (DES) Security and other relevant labor data by a task force of school officials, representatives of vocational education, business representatives, labor market specialists and college faculties.

- **Partnerships between individual high schools and individual corporations should be systematically established in all states**

  These partnerships should build upon the successful models, now in place around the country. Examples may be found in programs launched by Security Pacific Bank in California; General Electric in New York City; The Trilateral Partnership in Boston; and, the Bell System in Bridgeport and New Haven, Connecticut. What these programs have in common is loaning company professionals to teach or work with students in secondary public schools. A key element of such programs is the "model" building that occurs, especially for disadvantaged students.

2: Recommendations to Overcome A Regional Differential In the Capacity to Finance Higher Education

One of the most significant findings that emerged from the Commission's research and deliberations is the extent to which higher education is a growth industry. Indeed, New England's recent economic advances have been built largely around high technology, in which the region's colleges and universities have played a vital role.

If higher education is a regional growth industry, it ought to be treated as such. State tax policies should encourage private sector contributions to higher educational institutions. State policies also should promote flexibility in curricula and staffing that is responsive to business needs. Moreover, financial support for higher education among the six New England states should be increased. As a member of the Commission pointed out: "If we are going to do anything about our competitive situation we need to get a more enlightened perspective on the value of our public investment in education."

An important forum for assuring "the value of our public investment in education" is the state legislature. Yet, there are other important avenues by which public as well as private resources can be used more effectively to enhance the future of higher education as a public investment and as a growth industry: collaborative planning among key participants in the university and college systems within and among the New England states; and cooperative arrangements between educational institutions and industry through which firms would loan equipment and personnel and provide work scholarships to students.

A common theme in the recommendations that follow is that cooperative planning and new collaborative arrangements among educators, government officials and business leaders can help "stretch" our limited

educational resources much further. Another major theme is the need to improve the capacity of colleges and universities to provide technology-oriented skill development. However, many Commission members emphasize that skill development does not imply exclusively vocational skills, but also "the capacity to be well-developed people capable of having independent thought."

- **Industries in the region, especially in the high-tech field, should join together to finance "work scholarship" contracts at the college and university levels.**

  Under such a program, a consortium of industrial firms would guarantee a certain number of loans to support young people whom they wish to employ following the completion of their courses. Upon graduation, if a student works for a specified period for a company in the consortium, the loan would be regarded as a work scholarship and forgiven. Should a student decide to work elsewhere, his/her loan would have to be repaid to the consortium of companies participating in the program.

  The advantage of this approach is that it requires industry to pay for expanded university training services to meet the needs of companies in the region while, at the same time, requiring institutions of higher education to provide the necessary technical curricula.

- **Cooperative arrangements should be initiated through which colleges and universities can use state-of-the-art industry equipment on "off-hours."**

  These kinds of arrangements would offer short-term, temporary expedients for the problem of equipment and faculty shortages. Over the long run, however, colleges and university officials should work with business and government officials on plans to update the educational infrastructure (laboratories and state of the art equipment) for engineering and computer science fields.

- **Five-year state plans for higher education should be undertaken in each of the New England states. Massachusetts should build on the five-year planning process of the state Board of Regents.**

  Business, labor and higher education leaders — representing diverse labor market areas — should serve on working groups which formulate and supervise the implementation of these plans. These working groups should discuss specific manpower data, emerging manpower needs, and new mechanisms for financial support. Once formulated, the plans prepared by these working groups should be reviewed annually to take into account changing industry needs.

- **Colleges and universities should initiate "quality" reviews of their programs.**

  If higher education is to be treated differently in state tax structures, educators must acknowledge that it is essential to measure the quality of degree programs in their institutions. Toward this end, these institutions ought to examine the New York State process whereby a council consisting of educators, both out of state and in-state, assesses the quality

of Ph.D. level programs in public and private universities.* The New York State effort has resulted in a university self-examination process leading to a reduction in the number of weak programs and more resources for other program areas.

- **Public and private colleges ought to pool common resources and eliminate curricula redundancies, as well as provide new curricula and flexible staffing patterns in response to industry needs.**

  Just as the five-year planning process would provide incentives for intrastate cooperative planning, new incentives are needed for interstate planning among educational institutions. While acknowledging that universities and colleges must — and will continue to — compete for students and faculty, it is important, nonetheless, that in a period of scarce resources, these institutions collaborate on long-range planning.

  The region should expand and build upon some of the efforts in cooperative planning that are already underway. A notable example is the five college consortium of Amherst, Smith, Mount Holyoke, Hampshire, and the University of Massachusetts. This experiment could be adapted by public and private institutions throughout New England.

- **The community college system ought to concentrate on providing skill development for technical careers while still attempting to meet students broader educational needs.**

  The Commission fully recognizes the special role of community colleges in expanding opportunities for a broad segment of the population. Yet, community college programs should be adjusted to simultaneously meet the skilled employee requirements of high-tech firms and companies in the sophisticated service sector as well as the educational needs of this segment of the population. Curricula emphasis should be more vocationally-oriented, focusing on industrial training (e.g., machine operators) and office services (e.g., accounting, data processing) at the skilled and semi-skilled worker level. The "track record" of the vocational/technical system in New Hampshire demonstrates that such programs can operate successfully.

- **Universities and colleges should cooperatively develop the regional case for support from the private sector, including foundations and corporations.**

  Corporations, because of the benefits they receive, directly and indirectly, from colleges and universities in the region — such as employing their graduates — have a responsibility to understand the needs of institutions of higher learning for financial support. Specifically, higher education institutions should seek challenge grants from foundations which can be matched by corporations. Such initiatives should be taken cooperatively as well as individually by colleges and universities.

*New York State Board of Regents, Doctoral Evaluation Project, University of the State of New York.

- **One-on-one relationships should be established between individual companies and individual educational institutions enabling professionals to serve as part-term faculty at local colleges.**

  The purpose of this recommendation is to help overcome the difficulty experienced by colleges in attempting to hire quality teaching staffs in technology-oriented subjects and sophisticated services as enrollments in these fields increase. As an outcome of college/company discussions, a firm could make available skilled individuals who would be paid to provide part-time instruction in subject areas mutually determined by industry and the college.

- **Colleges and universities should increase their sponsorship of contracted training and education programs for business and industry.**

  A recent market study undertaken by the University of Massachusetts reveals that employers need and want contracted in-plant education and training programs in far greater numbers than local colleges and universities are providing them. Yet, structural and administrative difficulties complicate the current situation. One possibility for overcoming these problems is the creation of — or designation of — a group that could identify course needs of employers, potential instructors within local corporations, and colleges prepared to sponsor and certify courses. Such a group could then help match business and industry labor training needs with college and university training capacity.

3: Recommendations to Improve the Perception of New England as a Region of Opportunity

As the Commission's report indicates, New England continues to be more successful in attracting new college students than any other region in the country. However, living costs that are out of line with the national average and the perception of greater opportunities elsewhere are discouraging students from remaining in the region after graduation.

Yet, the performance of the New England economy — particularly in the areas of high technology and sophisticated services — has been most impressive. Indeed, the central focus of the following recommendations is for the region to "accentuate the positive," to tell its story to a broader audience, and to encourage a new way of thinking about New England, within as well as outside the region.

The communications campaign envisioned in the recommendations that follow is one in which key participants in the region's economy — including academic institutions, business firms, and state governments — have a major stake. Accordingly, a commitment to play a role in improving the region's image is required on the part of each of these participants.

- **The New England Board of Higher Education, in conjunction with the six state governors, should launch a joint effort to publicize the attractiveness of the region as a place to study, work and live.**

Given the highly favorable economic forecast for New England in the 1980s - as documented, for example, in a recent report by the Joint Center for Urban Studies of MIT and Harvard University entitled "Regional Diversity" — we can justifiably laud the virtues of the region. The economic and cultural vitality and knowledge-intensive structure of New England society should be presented vividly and cooperatively by the New England Board of Higher Education and the governors as a priority initiative on behalf of continued regional development.

A strong region-wide commitment directed toward attracting and keeping students, skilled workers, and talented graduates in New England should be the focus of this effort. A communications campaign along these lines would help to build an appreciation of our strengths within as well as outside the region.

To this end, the Commission recommends that funds be raised to establish an ongoing communications campaign and support services. One possibility is that the New England Board of Higher Education, working with the governors, request that business firms, state governments, and universities donate one-half of one percent of their public information budgets which can be pooled to support regional promotional programs.

The Commission notes that all universities and colleges in Rhode Island have jointly funded, designed and published recruiting material for the state. This kind of effort — on a broader regional basis — is envisioned in this recommendation.

- **The interdependent relationship between the region's educational capacity and the success of business firms located here should be documented as a major component in the publicity campaign recommended above.**

Specifically in the area of research and development activity, New England has a concentration of colleges and universities unequalled in other regions and, in the words of one Commission member, "Ph.D = R & D". The linkages between this academic R & D activity, corporate R & D activity, and the international preeminence of many regional business firms has not been — but ought to be — clearly established. The Commission calls upon the Massachusetts High Technology Council (MHTC) to document this relationship based on the experience of MHTC firms.

- **Institutions of higher education in the region should demonstrate innovative techniques which could be used especially to retrain established mid-career workers for occupational skills that are in demand by industry.**

Retraining is needed for workers whose jobs have become obsolete, and would be particularly valuable in assisting government workers who have lost their jobs as a result of cutbacks in federal, state, and local budgets. Upgrading is equally important, enabling workers to improve their vocational skills and enhance their earnings capacity. The availability

of both effective retraining and upgrading programs would help to confirm the view that the region is an area of economic opportunity.

Finally, the presence of an older work force — cited in this report — need not be viewed as a regional economic disadvantage. Indeed, as one Commission member — representing a high tech-firm — pointed out, "Having an aging population is viewed by my company as a regional advantage because of the stable skill level of the work force. We are concerned about not having enough young people, but the maturity of the work force need not be strictly a negative."

A Call to Action: The Next Step

The Commission stands ready to work with leaders from state government, education, and industry who will be called upon to implement the new policies and programs contained in the preceding recommendations. Toward this end, we believe that an ad hoc committee should be created, composed of members from each of the six state legislatures, including members of the finance, education, and appropriations committees. As a first step, this committee should hold public hearings in every state in the region on the issues raised in this report. Business and industry leaders should participate in the hearings to demonstrate the important role of higher education in the region's economic growth.

A central goal of the hearings should be identifying ways in which the public and business sectors can facilitate the contributions of higher educational institutions to economic development in the region. One agenda item would be financing the costs of higher education — faculty and curriculum development in particular — in response to changing economic needs. Specifically, state tax systems can be used more creatively to strengthen the higher educational system. Among the options that might be considered are earmarking a portion of the business profits tax for expanding the engineering capacity of New England colleges and universities, both public and private; and special tax treatment — or preferably matching grants — for corporations that make contributions to educational institutions in terms of staff, facilities, and equipment.

The hearings should also identify "planning disincentives" that affect publicly-controlled higher education, and which ought to be removed. A disincentive cited by college and university officials is that savings in one part of a public college/university system cannot be reallocated to other areas. Instead, those savings must be returned to the state. This situation prevents publicly-controlled universities and colleges from applying savings to upgrade staffing, facilities, and equipment in newly-emerging technical fields.

The Commission fully expects that these hearings will also deal with a situation that one Commission member termed "a state of emergency": alleviating the shortage of high school mathematics and science teachers through modified certification standards and differential salaries.

An important outcome of the hearings would be a broad base of support for new policies and actions that are regarded as priority concerns. Equally important is a mutual understanding of how leaders from education, industry, and state government can participate in this process, collaboratively working to strengthen the relationship between New England's higher educational institutions and the region's economy.

Acknowledgments

The New England Board of Higher Education is grateful to the foundations that have supported the first stage of the work of the Commission and made this report possible. The Ford Foundation provided the seed money to launch the Commission project. The W. K. Kellogg Foundation and the Andrew W. Mellon Foundation provided grants to support the studies, writing conferences, and publications that define the issues and needs of the New England economy and higher education. The Calvin K. Kazanjian Economics Foundation provided a gift to continue the analysis of New England's economic needs.

There is little precedent for a project promoting the regional relationship and reciprocal interaction of higher education with private industry. The vision of the foundations supporting the Commission from the outset has made possible the dissemination of new data, information, and ideas found in the Commission's publications.

We are also indebted to the Corporate Council for supporting the work of the Commission. The founding members of the Corporate Council include:

The Barnes Group Inc.
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General Electric Foundation
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The Hartford Insurance Group
The Raytheon Company
The Rogers Corporation
Sanders Associates
Wheelabrator Frye Inc.

The leadership exhibited by these corporations has given the Commission latitude in shaping its investigations to timely economic issues confronted in New England.

We gratefully acknowledge the work of Diane Fulman, Consultant to the First National Bank of Boston and the Commission in providing dedicated, consistent, and insightful effort in the preparation of *A Threat to Excellence*.

We have appreciated the very significant contributions of data, analysis, and counsel provided by the American Council on Education, The College Board, the Federal Reserve Bank of Boston, the National Center for Educational Statistics, *New England Business*, and the New England Regional Commission.

The staff of the New England Board of Higher Education, in working with the Commission, provided invaluable assistance.